

Parental, Peer, School, and Neighborhood Influences on Adolescent Substance Use: Direct and Indirect Effects and Ethnic Variations

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Abstract:

The current study examined how contextual influences are related to adolescent substance use using an ethnically diverse sample of adolescents. A total of 5,992 adolescents (5,185 European American, 330 African American, 160 Hispanic American, 179 Asian American, and 138 Southeast Asian American) from Dane county, Wisconsin, completed surveys at school. Structural equation modeling was conducted to examine direct versus indirect effects of parental, peer, school, and neighborhood influences and differences in associations across ethnicity. Results indicated that contextual influences on adolescent substance use were both direct and indirect; the strength of associations between contextual influences and adolescent substance use varied across ethnic groups.

Keywords: adolescent substance use | ethnicity | neighborhood cohesion | parenting | peer substance use | school connection

Article:

INTRODUCTION

Adolescent substance use continues to be a significant public health concern in American society; 45.3% of U.S. adolescents report ever using alcohol, 25% report using marijuana in the past year, and 11.7% report using cigarettes in the past month (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Because of the well-known risks associated with adolescent substance use (e.g., mental health problems, risky sexual behaviors, lung cancer) (Bonomo et al., 2001), understanding factors that either promote (risk factors) or reduce (protective factors) the likelihood of adolescent use is a clear research priority.

To date, researchers have focused on contextual influences related to peers, parents, schools, and neighborhoods as the primary risk/protective factors associated with adolescent substance use (Cleveland, Feinberg, Bontempo, & Greenberg, 2008; Hawkins, Catalano, & Miller, 1992). Findings from these efforts have produced crucial data regarding possible intervention and prevention strategies; however, two significant gaps in the literature persist. First, it is not clear to what extent each of these contextual influences exerts direct or indirect influences (or both) on adolescent substance use. For example, many researchers argue that parents exert relatively low influence during adolescence and, instead, play more of an indirect role by influencing peer associations, which, in turn, more strongly influence use (Chuang, Ennett, Bauman, & Foshee, 2005; Hawkins et al., 1992; Rose, 1999). Second, the majority of research and conceptual models regarding contextual influences on adolescent substance use are derived from European American adolescents. As such, the extent to which specific contextual influences are universally related to substance use across ethnicity is mostly unknown. Given the rapid demographic changes related to increased proportions of adolescents who are Asian and Hispanic Americans, intervention efforts targeting reduced risk factors and promoting protective factors based on this limited research may lack optimal efficacy in reducing substance use.

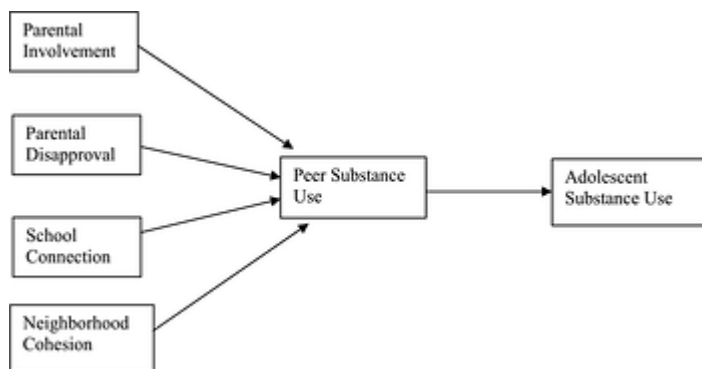


Figure 1. The indirect effects model

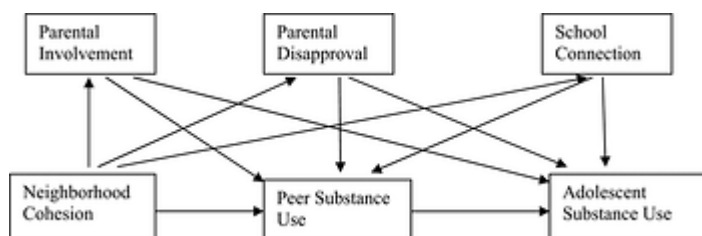


Figure 2. The direct and indirect effects model

Contextual Influences on Adolescent Substance Use

Due to increased autonomy during adolescence and increased time spent with peers, parents may have less direct influence on adolescent substance use compared to adolescents' peers. For example, Oetting and Beauvais (1986) suggested that *peer clusters*, or small, cohesive subgroups

of close friends who spend substantial time together, are a primary risk factor for deviant behaviors generally and substance use specifically. Like-minded adolescents, who associate together, may develop a set of shared norms regarding certain behaviors (including substance use) and—due to their large amounts of time together—reinforce attitudes and behaviors regarding substance use. Consistent with this argument, studies suggest that adolescents who affiliate with substance using peers and who perceive that their friends use substances are at risk to use drugs and alcohol themselves (Henry, 2008; Prinstein, Boergers, & Spirito, 2001).

Although peers may be viewed as the strongest contextual influence, parents also clearly exert influence. There is debate, however, because some studies suggest that parental influence is predominantly indirect (certain parenting styles are associated with adolescents' choice of more deviant peers), whereas other studies have directly linked parental disapproval of drug use, warmth/support, monitoring of free-time activities, and behavioral control with reduced substance use (Barnes, Reifman, Farrell, & Dintcheff, 2000; Bogenschneider, Wu, Raffaelli, & Tsay, 1998; Mayberry, Espelage, & Koenig, 2009; Nash, McQueen, & Bray, 2005; Sargent & Dalton, 2001).

Beyond parental and peer influences, schools represent an additional key context, with most studies pointing to a sense of connection to school (resulting from supportive relationships with peers and school personnel, feeling safe) as protective against risk behaviors, such as substance use (Bond et al., 2007; Catalano, Haggerty, Oesterle, Fleming & Hawkins, 2004). Even broader contexts, such as communities and neighborhoods, have also been proposed as key influences, with studies suggesting that a sense of cohesion, safety, and support in one's neighborhood is associated with lowered adolescent substance use (Mayberry et al., 2009), even after controlling for individual and family-level factors (Winstanley, Steinwachs, Ensminger, Latkin, Stitzer, 2008). Moreover, neighborhood cohesion was found to mediate the influence of neighborhood poverty and the availability of drugs in neighborhood on adolescent substance use (Duncan, Duncan, & Strycker, 2002).

Indirect and Direct Contextual Influences

Although research has identified important contextual influences and their individual associations with adolescent substance use, few studies have considered these multiple contextual influences in the same analysis with fewer studies considering the possibility that some contextual influences are only indirectly related. As such, the extent to which one specific contextual factor (e.g., peers) may exert a stronger influence than others (e.g., schools) is mostly unknown. This lack of research is noteworthy given arguments by Oetting and Beauvais (1986) and Oetting and Donnermeyer (1998) suggesting that peer clusters, parents, schools, and neighborhoods function together in influencing adolescent risk behaviors, including substance use. One conceptualization suggests that peers have the strongest influence on substance use during adolescence, whereas other influences, including parents, schools, and neighborhoods, are relevant but proposed to only affect adolescents' substance use indirectly through peer influence

(peer cluster theory) (Oetting & Beauvais, 1986). An alternative conceptualization (primary socialization theory) (Oetting & Donnermeyer, 1998) proposes that peers, parents, and school are all primary socialization factors that exert both direct influences on adolescent substance use and indirect influences via peer associations. This latter theory also posits that neighborhoods are more distal or secondary socialization sources influencing adolescent substance use only indirectly through peer, parental, and school influences.

Although few studies exist, recent findings support primary socialization theory in that parental and school influences on adolescent substance use tend to be both direct and indirect (Henry, 2008; Lopez et al., 2008; Pilgrim, Schulenberg, O'Malley, Bachman, & Johnston, 2006). However, no study to date has directly evaluated these two theories simultaneously to evaluate the relative merits of the two alternative conceptualizations. Moreover, little research has considered direct and indirect effects of contextual influences related to adolescent substance use, as suggested by these two theories in ethnic minority samples (Galliher, Evans, & Weiser, 2007; Kim, Zane, & Hong, 2002). The possibility remains then that questions regarding direct versus indirect associations between contextual influences and adolescent drug use may vary across ethnicity (Oetting, Donnermeyer, Trimble, & Beauvais, 1998).

Research on ethnic minority family relationships provides evidence to suggest that risk/protective factors and their associations with adolescent substance use may vary across ethnicity. For example, parents may be more influential (compared to peers) in cultures endorsing familism (e.g., Hispanic Americans) (Sabogal, Marín, Otero-Sabogal, Marín, & Perez-Stable, 1987), obligation to parents and respect (e.g., Asian Americans) (Chao, & Tseng, 2002), and authoritarian parenting (e.g., African Americans) (Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994) relative to what is expected for European Americans. Consequently, it remains to be seen if, in certain ethnic groups, parents are less influential than are peers. Moreover, studies have suggested that parental warmth and acceptance may be more strongly related to substance use for Hispanic American adolescents than for European American and African American adolescents (Broman, Reckase, & Freedman-Doan, 2006) and that peer influence may be more strongly related among European American adolescents than for African Americans (Brown, Miller, & Clayton, 2004). Studies have also suggested differential associations between neighborhood poverty and adolescent smoking (stronger association among European Americans than African Americans) (Nowlin & Colder, 2007). Furthermore, most comparative studies neglect to include Asian Americans (and in particular Southeast Asian Americans) and, consequently, little is known regarding contextual influences on substance use for this growing population of young people.

Aims and Hypotheses

The aim of this study was to develop and evaluate two alternative models specifying how contextual influences are related to adolescent substance use. An additional focus was to examine possible ethnic variation in the magnitude of associations across diverse groups of

adolescents. The two conceptual models were based on peer cluster and primary socialization theories. The first model (called the indirect effects model) is similar to peer cluster theory and proposes that parental, school, and neighborhood influences are only indirectly linked to adolescent substance use via peers. The second model (called the direct and indirect effects model) is based on primary socialization theory and proposes direct and indirect associations between parenting and school factors and substance use but an indirect association only for neighborhood influences. Using structural equation modeling (SEM), the relative fit of these two alternative models was compared to ascertain which model better represents associations between these study constructs. In addition, multi-group analyses (MGA) were conducted to compare the magnitude of associations across several ethnic groups.

Given that the existing literature generally supports both direct and indirect effects of not only peers, but also family and school contexts on adolescent substance use, it was hypothesized that the direct and indirect effects model would demonstrate a superior fit to the data than would the indirect effects model. Although research on ethnic variations in contextual influences on adolescent substance use is limited, extant comparison studies seem to suggest a stronger parental influence for Hispanic American adolescents compared with European American adolescents and a weaker peer influence for African American adolescents than for European American adolescents. Thus, the current study hypothesized that associations between parental involvement, parental disapproval, and adolescent substance use would be stronger for Hispanic American adolescents than for European American adolescents and that the association between peer substance use and adolescent substance use would be weaker for African Americans than for European Americans. However, no hypotheses were derived for the differences in associations between school connection and neighborhood cohesion and adolescent substance use; no specific hypotheses were derived for the differences in contextual influences between the Asian American and Southeast Asian American and the European American adolescents because of the lack of previous research regarding these issues.

METHODS

Participants and Procedures

Participants in this study included 5,992 students who participated in the 2000 Dane County (Wisconsin) Youth Assessment (DCYA). In terms of race/ethnicity, 86.5% ($n = 5,185$) of the students identified themselves as European American, 5.5% ($n = 330$) were African American, 2.7% ($n = 160$) were Hispanic American, 3.0% ($n = 179$) were Asian American, and 2.3% ($n = 138$) were Southeast Asian American. Although the survey only allowed students to choose panethnic labels, local census data suggest that the Hispanic American group in this study is majority Mexican origin, followed by Salvadoran and Puerto Rican, with smaller groups also represented. The Asian American group is predominantly children of relatively highly educated professionals who are Chinese, Korean, and Indian. The Southeast Asian American group is predominantly Hmong, as well as smaller groups of Thai, Vietnamese, and Cambodians

(Gleason, 2003). Average age of respondents in the overall sample was 14.8 years and 51% of respondents were girls.

Surveys were administered to students in school by trained research assistants. Parents were notified of the survey in writing several weeks prior to its administration and were given the option to withhold their consent if they did not wish their child to be surveyed. This survey is conducted every 5 years by the Dane County Youth Commission and this version of the survey included 173 items assessing health-related outcomes and contextual influences on adolescent development. Survey items were, in some cases, single items designed to assess a particular developmental issue and, in other cases, may be indicators of a broader construct. As such, it is necessary when using this data set to first evaluate survey items and do preliminary analyses to develop summary measures to represent key study constructs.

Measures

Exploratory factor analyses (EFAs) were conducted to guide the construction of measures used in this study. Items were selected that indicated adolescents' peer, parental, school, and neighborhood related perceptions and experiences and substance use behaviors. The first EFA focused on creating measures for the contextual influences of peers, parents, school, and neighborhood with related items that were selected from the survey. Rotated factor loadings were then examined to guide the construction of summary variables. A factor loading of .40 or higher indicated that an item loaded onto a specific factor, and consequently any items failing to demonstrate a factor loading of .40 or higher, were dropped, as were items demonstrating cross-loadings across multiple factors. This approach resulted in five conceptually plausible factors that represent peer substance use, parental involvement, parental disapproval of substance use, school connection, and neighborhood cohesion as described separately below.

PEER SUBSTANCE USE

Adolescents reported on two items regarding peer substance use: "Most of my friends do not drink or do drugs" and "Most of my friends do not smoke cigarettes or chew tobacco." Responses to these two items ranged from 0 (strongly agree) to 3 (strongly disagree), and the Pearson correlation between the two items was 0.78.

PARENTAL INVOLVEMENT

A six-item scale assessed adolescents' perceptions that their parents monitor their free-time behaviors and are supportive and caring ($\alpha = 0.83$). Sample items are the following: "When I go out my parent(s) ask me where I am going" and "My parent(s) are there when I need them." Students responded to each item based on a scale ranging from 0 (never) to 4 (very often).

PARENTAL DISAPPROVAL OF SUBSTANCE USE

Two items were used to measure adolescents' perceptions of their own parents' attitude toward substance use by teenagers: "My parent(s) think it is wrong for teens my age to drink alcohol" and "My parent(s) think it is wrong for teens my age to smoke/chew tobacco." Pearson correlation between these two items was 0.72.

SCHOOL CONNECTION

A six-item scale asked how much students agree or disagree with statements regarding their feelings of connection to school ($\alpha = 0.77$). Response options ranged from 0 (strongly agree) to 3 (strongly disagree). Sample items included the following: "I enjoy going to school" and "My teachers care about me and how well I do in school." The scale was reverse coded so that higher scores indicated a higher school connection.

NEIGHBORHOOD COHESION

A five-item scale assessed the extent to which adolescents perceive their neighborhoods as a cohesive and safe environment ($\alpha = .70$). Response options ranged from 0 (strongly agree) to 3 (strongly disagree). Sample items included the following "People in my community know and care about each other" and "My neighborhood is a safe place to live." Items were reverse coded such that higher scores indicated a more positive sense of neighborhood cohesion.

ADOLESCENT SUBSTANCE USE

An additional EFA was conducted with a total of nine items taken from the survey regarding adolescents' report on their own use of smoking tobacco (cigarettes, cigar, pipe), beer and wine, hard liquor, marijuana, inhalants, hallucinogens, cocaine, stimulants, and unauthorized prescription in the past year. Adolescents' responses to these nine items were the following: (1) not at all, (2) once or twice, (3) 1-3 times per month, (4) 1-3 times per week, (5) 4-6 times per week, and (6) daily. The EFA with varimax rotation yielded two factors, with one factor (labeled normative substance use) comprised of four items regarding use of smoking tobacco, beer and wine, hard liquor, and marijuana, and a second factor (labeled illicit substance use) composed of the other five items regarding use of inhalants, hallucinogens, cocaine, stimulants, and unauthorized prescription drugs. Mean scores were created separately for both normative drug use and illicit drug use items as indicators of normative substance use and illicit substance use.

A preliminary examination of the distributive properties of these two measurement scales suggested that both measures were highly skewed. Because square root transformation has been suggested to be useful for stabilizing variances and decreasing skewness (Howell, 2007), square root transformation was applied to each substance use summary variable. Although this procedure successfully reduced the skewness of normative substance use to an acceptable level, the illicit substance use measure remained highly skewed. Moreover, given that the percentage of adolescents engaging in more illicit substance use was relatively low in these data, we elected to only include the normative substance use measure (square root of the mean score of tobacco,

beer and wine, hard liquor, and marijuana use) in the substantive analysis as an indicator of adolescent substance use. Cronbach's alpha for this scale was 0.85.

RESULTS

All analyses were conducted using AMOS version 18 software. Multi-group confirmatory factor analyses of measurement models (previously constructed based on the EFA) were analyzed on a construct by construct basis with each ethnic minority group compared with the European American respondents to compare factor loadings and item intercepts across groups (following the approach outlined by Byrne, 2001). These analyses were necessary to demonstrate that measurement invariance in factor loadings was ascertained and study constructs had similar meaning across the groups and so that associations between study constructs would be comparable across groups. Analyses involved a comparison of the relative fit of a model with these parameters freely estimated to a model where the factor loadings were constrained to equality across the comparison groups (via a chi-squared difference test). Results indicated measurement invariance for all constructs, suggesting that across-group differences in associations between these measures and adolescent substance use were not biased due to group differences in measurement (Steenkamp & Baumgartner, 1998).

Means and standard deviations for demographics and study constructs are shown in Table 1 for the total sample and by ethnicity. African American, Hispanic American, and Southeast Asian American adolescents reported lower levels of parental involvement and neighborhood cohesion than European American adolescents. Asian American adolescents reported lower levels of self and peer substance use compared with European American adolescents. Southeast Asian American adolescents also reported lower level of substance use than European American adolescents.

Table 1. Descriptive Statistics of the Total Sample and Sample by Ethnicity

Demographic and key variables	Total sample (<i>N</i> = 5,992)	European American (<i>n</i> = 5,185)	Hispanic American (<i>n</i> = 160)	African American (<i>n</i> = 330)	Asian American (<i>n</i> = 179)	Southeast Asian American (<i>n</i> = 138)
Age	14.85 (1.72)	14.88 (1.73)	14.73 (1.65)	14.53 (1.65)*	14.66 (1.86)	14.84 (1.72)
Mother education	3.06 (1.71)	3.13 (1.68)	2.20 (1.93)*	2.48 (1.62)*	3.43 (2.00)	1.40 (1.51)*
Father education	3.29 (1.83)	3.35 (1.80)	2.24 (1.97)*	2.60 (1.78)*	4.01 (1.97)*	2.41 (1.47)*

(<i>n</i> = 330)										
Peer cluster model	20.20	4	<.01	5.05	.89	.11	60	Poor		
Primary socialization model	3.53	1	.06	3.53	.98	.09	56	Acceptable	16.67 ^a	.09
Hispanic American (<i>n</i> = 160)										
Peer cluster model	24.41	4	<.01	6.10	.79	.18	70	Poor ^a		
Primary socialization model	.07	1	.79	.07	1.00	.00	52	Good	24.34 ^a	.21
Southeast Asian American (<i>n</i> = 138)										
Peer cluster model	4.70	4	.32	1.18	.99	.04	51	Good		
Primary socialization model	.95	1	.33	.95	1.00	.00	53	Good	3.75	.01
Asian American (<i>n</i> = 179)										
Peer cluster model	7.69	4	.10	1.92	.98	.07	54	Acceptable		
Primary socialization model	.01	1	.92	.01	1.00	.00	52	Good	7.68 ^b	.02

Note. ^a $\Delta\chi^2$ was statistically significant, $p < .05$. ^b $\Delta\chi^2$ approached statistical significance, $p = .053$. CFI = comparative fit index; RMSEA = root mean square error of approximation; AIC = Akaike's Informational Criteria.

The most popularly used index in model comparison involves a comparison in chi-square values across nested models—a significant difference of chi-square ($\Delta\chi^2$) between two nested models indicates a significant difference in model fit (in the current study, the indirect effects model was nested within the direct and indirect effects model). However in large samples trivial differences in model fit lead to significant $\Delta\chi^2$ and, consequently, we also relied on a $\Delta\text{CFI} > 0.01$ to indicate that significant differences across models exist (Cheung & Rensvold, 2002). An examination of the $\Delta\chi^2$ and ΔCFI between the indirect effects model and the direct and indirect effects model indicated that the latter model demonstrated a superior fit in the European American, African American, Hispanic American, and Asian American groups ($\Delta\chi^2$ was significant; $\Delta\text{CFI} > 0.01$) (Table 2). However, the two models demonstrated a statistically equivalent fit for the Southeast Asian American group ($\Delta\chi^2$ was not significant; $\Delta\text{CFI} = 0.01$). These findings suggest that contextual influences on substance use were better described as both direct and indirect than only indirect via peer influence for European American, African American, Hispanic American, and Asian American adolescents, whereas for Southeast Asian American adolescents direct effects of contextual influences other than peer influence might exist but were trivial compared with indirect effects.

Multi-Group Analysis: Ethnic Variations in Contextual Influences

Multi-group analyses allowed for a comparison of associations between contextual factors and substance use across the five ethnic groups. The European American group was used as the reference category to compare coefficients from the direct and indirect effects model. Results demonstrated a significant $\Delta\chi^2$ and a ΔCFI greater than 0.01—indicating a worsened fit by specifying coefficients to be equal across comparison groups—when comparing African

American, Hispanic American, and Southeast Asian American adolescents to European American adolescents. However, results revealed no differences between European American and Asian American adolescents (Table 3). An examination of specific associations (using parameter comparison critical ratios tests provided by AMOS) when comparing African Americans to European Americans suggested that the association between peer substance use and adolescent substance use was weaker for African American adolescents than for European American adolescents ($B = 0.35$ for European Americans; $B = 0.19$ for African Americans; critical ratio = -4.33). The negative association between school connection and peer substance use was also weaker for African Americans compared to European American adolescents ($B = -0.35$ for European Americans; $B = 0.05$ for African Americans; critical ratio = 3.68). In addition, neighborhood cohesion was more strongly associated with parental involvement ($B = 0.42$ for European Americans; $B = 0.19$ for African Americans; critical ratio = -2.43) and school connection ($B = 0.44$ for European Americans; $B = 0.32$ for African Americans; critical ratios = -2.32) for European American than for African American adolescents.

Table 3. Unstandardized and Standardized Parameter Estimates across Ethnic Groups

	B (β)				
Parameter estimate	European American (<i>n</i> = 5185)	African American (<i>n</i> = 330)	Hispanic American (<i>n</i> = 160)	Southeast Asian American (<i>n</i> = 138)	Asian American (<i>n</i> = 179)
Neighborhood cohesion→peer substance use	-.20 (-.11)	-.27 (-.19)	-.24 (-.16)	-.00 (-.00)	-.04 (-.02)
Neighborhood cohesion→parental involvement	.42 (.30)	.19 (.13) ^a	.46 (.30)	.26 (.17)	.59 (.40)
Neighborhood cohesion→parental disapproval	.34 (.20)	.23 (.15)	.46 (.26)	.20 (.12)	.09 (.05)
Neighborhood cohesion→school connection	.44 (.44)	.32 (.36) ^a	.36 (.40)	.28 (.29)	.33 (.40)
Parental involvement→peer	-.15 (-.11)	-.04 (-.04)	-.03 (-.03)	-.27 (-.27)	-.16 (-.15)

substance use					
Parental disapproval→peer substance use	-.25 (-.24)	-.27 (-.30)	-.04 (-.05) ^a	-.06 (-.06) ^a	-.29 (-.30)
School connection→peer substance use	-.35 (-.19)	.05 (.03) ^a	-.27 (-.17)	-.27 (-.16)	-.45 (-.23)
Peer substance use→adolescent substance use	.35 (.57)	.19 (.32) ^a	.19 (.30) ^a	.23 (.41) ^a	.30 (.52)
Parental involvement→adolescent substance use	-.08 (-.09)	-.05 (-.09)	-.25 (-.41) ^a	-.06 (-.11)	-.04 (-.06)
Parental disapproval→adolescent substance use	-.08 (-.12)	-.09 (-.16)	-.01 (-.02)	-.02 (-.04)	-.04 (-.08)
School connection→adolescent substance use	-.08 (-.07)	-.09 (-.10)	.04 (.04)	-.09 (-.10)	-.15 (-.13)

Note. Standardized coefficients are in parenthesis. Coefficients $p < .05$ are in boldface.

^a Indicates significant difference from the coefficients of the European American sample.

Significant differences between Hispanic American and European American adolescents centered on a stronger negative association between parental disapproval and peer substance use ($B = -0.25$ for European Americans; $B = -0.04$ for Hispanic Americans; critical ratio = 2.79) and a stronger positive association between peer substance use and own use ($B = 0.35$ for European Americans; $B = 0.19$ for Hispanic Americans; critical ratio = -3.35) among European American adolescents. On the other hand, the influence of parental involvement on adolescent substance use was stronger for Hispanic Americans than it was for European American adolescents ($B = -0.08$ for European Americans; $B = -0.25$ for Hispanic Americans; critical ratio = -3.56).

When comparing the Southeast Asian American to the European American group, the associations between parental disapproval and peer substance use ($B = -0.25$ for European Americans; $B = -0.06$ for Southeast Asian Americans; critical ratio = -2.35) and between peer substance use and own use ($B = 0.35$ for European Americans; $B = 0.23$ for Southeast Asian Americans; critical ratio = -2.60) were both stronger for European Americans than for Southeast Asian American adolescents.

DISCUSSION

The aims of the current study were to address gaps in the literature on adolescent substance use by (a) examining whether parental, school, and neighborhood factors primarily exert indirect influences on adolescent substance use via peer influence or are best specified as both indirectly and directly related and by (b) examining variation in these associations across ethnically diverse groups of adolescents. Findings from this study suggested that contextual influences on adolescent substance use may be more accurately conceptualized as having both direct and indirect effects and that contextual influences on substance use vary depending on the ethnic group adolescents belong to, particularly in reference to peer and parental influences.

Consistent with previous studies, adolescents who reported associating with substance using peers were more likely to report using substances themselves. However, as hypothesized, this association varied across ethnicity, with peer associations more strongly related to substance use among European American adolescents than for African Americans, Hispanic Americans, and Southeast Asian Americans. Such findings support previous studies (Brown et al., 2004; Newcomb & Bentler, 1986) in pointing to possible cultural differences in how peer associations influence substance use. Possible explanations for such findings are that African Americans are less vulnerable to modeling effects of peers (Griesler & Kandel, 1998; Newcomb & Bentler, 1986) or that exposure to substance-using models might occur at a younger age and, as such, adolescence may not be the critical period for peer influence on substance use among African Americans (Newcomb & Bentler, 1986). The weaker influence of peer substance use on Hispanic American adolescents might be explained, at least partially, by the relatively stronger influence of parents or a cultural orientation toward familism that is protective factor against negative peer influences (Roosa et al., 2011).

In addition, as expected, adolescents who perceived their parents as caring and disapproving of substance use were less likely to use substances themselves and less likely to associate with substance using peers, suggesting that parental influences on adolescent substance use are both direct and indirect via peer associations. However, these associations were qualified by ethnicity and suggested that there may be cultural differences in the role of parents. Compared with other groups of adolescents, parental involvement was most strongly and negatively related to substance use among Hispanic Americans. On the other hand, parental disapproval was less strongly associated with associating with drug using peers among Hispanic Americans. Perhaps for Hispanic Americans a cultural emphasis on familism (Sabogal et al., 1987) results in protection related to substance use due to their close, warm, and supportive relationships with their parents, whereas there may be less cultural emphasis (compared with European Americans) on openly conveying disapproval of substance use.

In reference to school connection, the findings suggested that school connection was associated with reduced adolescent substance use directly (and ethnicity did not moderate this association) and also indirectly through lowered associations with substance using peers. As such, school

connection is another protective factor that directly and indirectly relates to substance use. There were ethnic differences in the link between school connection and peer substance use suggesting that this association was weaker for African American adolescents than for European Americans. Although explaining these findings requires further research, it may be that forming connection to school plays less of a role in associating with drug-using peers among African Americans.

In addition, adolescents who perceive their neighborhoods as safe and cohesive are less likely to associate with substance using peers, more likely to perceive their parents as caring, involving, and disapproving of substance use, and more likely to feel positively connected to school, which in turn relate to reduced substance use. However, ethnic variation was also evident, as the positive association between neighborhood cohesion and school connection and the association between neighborhood cohesion and parental involvement were weaker among African Americans compared with European American adolescents. One possible explanation for these findings is that, due to racial differences in socioeconomic status and in residential segregation, African American families may reside more often in high-risk neighborhoods and, as a result, have less sensitivity to positive aspects of the neighborhood (such as cohesion). In addition, neighborhood cohesion coefficients were quite small for the two Asian American subsamples; however, the coefficients were not statistically different, perhaps due to relatively modest samples sizes for these latter groups.

Although few comparative studies of adolescent substance use include samples of Asian Americans, these findings suggested little variation in associations between parental, peer, school, and neighborhood influences and adolescent substance use between the Asian American and European American group, suggesting that these contextual influences function similarly in influencing substance use of Asian American and European American adolescents. However, results indicated that the association between parental disapproval and peer substance use was weaker for Southeast Asian American adolescents than for European American adolescents. Southeast Asian American families may have less open communication, resulting in lowered parental awareness of substance use as a relatively normative aspect of adolescence (Supple, McCoy, & Wang, 2010; Xiong, Tuicompee & Rettig, 2008). Consequently, viewed through a cultural lens, many Southeast Asian American parents would be unlikely to convey disapproval of substance use both because of relatively low open communication and because of a lack of familiarity with drug use as a problem of adolescence.

Limitations of this study included the cross-sectional nature of these data, reliance on a regional sample from only one county in the United States, adolescent reports for all study variables, and limited items to assess peer influences. Consequently, certain questions remain; for example, directionality in peer influence because research has suggested that in addition to peers influencing substance use, substance using adolescents also seek out similar peers (Wills & Cleary, 1999) and whether, with more comprehensive assessments of peer influences, the indirect only model may have had greater support. In addition, reliance on only adolescent reporters may inflate associations in some cases given that adolescents who use substances might

be more likely to perceive their peers as using substances (Bauman & Ennett, 1996). On the other hand, the availability of a large and ethnically diverse community sample and findings highlighting the importance of considering ethnic differences in risk/protective factors for adolescent substance use are strengths.

Implications

Intervention efforts targeted at reducing adolescent substance use may have greater or lesser efficacy depending on the target risk/protective factors and the cultural group that is the audience for the intervention. For example, although the well-known social norms approach to substance use intervention and prevention emphasizes targeting at adolescents' perceptions of peer substance use (Berkowitz, 2005), our findings suggested that this strategy might not be as effective for ethnic minority adolescents as it is for European American adolescents. On the other hand, programs aimed at parental involvement may be particularly effective for Hispanic American adolescents, whereas encouraging parents to convey disapproving messages regarding drug and alcohol use to teens might be more effective in reducing association with substance using peers for European, African, and Asian American adolescents. Findings also suggested that promoting connection to school and cohesion in neighborhood may be other promising targets for interventions as these factors are either directly or indirectly related to lower adolescent substance use, although the protective effects of school connection and neighborhood cohesion might be less strong among African American adolescents.

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